IDAHO
DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION

Job Performance Report

Project F-71-R-11

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 3(GC)-a. Region 3 (Boise) Mountain Lakes Investigations
Job No. 3(GC)-b. Region 3 (Boise) Lowland Lakes and Reservoirs Investigations
Job No. 3(GC)-c. Region 3 (Boise) River and Stream Investigations
Job No. 3(GC)-d. Region 3 (Boise) Technical Guidance

by

Will Reid, Regional Fishery Manager
Brent Mabbott, Regional Fishery Biologist

October 1987

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JOB PERFORMANCE REPORT

State of: Idaho

Project No.: F-71-R-11

Job No.: 3(GC)-a

Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Title: Region 3 (Boise) Mountain Lakes Investigations

Period Covered: July 1, 1986 to June 30, 1987

ABSTRACT

Idaho Department of Fish and Game (IDFG) and other interested persons collected information from six lakes in the Cat Creek Lakes, five lakes in the Red Mountain area and 11 lakes in the Queens, Little Queens and Johnson Creek areas. From each, we recorded the lake size, location, presence of spawning gravels and length of fish sampled and observed.

Authors:

Will Reid
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OBJECTIVES

To obtain species composition, relative abundance, age structure, spawning availability, general lake morphology and angler use from selected lakes in the Red Mountain area and the Queens and Little Queens river drainages.

RECOMMENDATION

Eliminate stocking of Cat Creek Lake No. 2 due to severe winterkill problems.

TECHNIQUES USED

Idaho Department of Fish and Game personnel and others visited six lakes in the Cat Creek Lakes, five lakes in the Red Mountain area and 11 lakes in the Queens and Little Queens river drainages of Middle Fork Boise River (Fig. 1). Survey personnel visited each lake and recorded size, inlet and outlet configuration and species of fish observed or captured.

FINDINGS

Data from the Cat Creek and Red Mountain lakes is summarized in Tables 1 and 2. No trails exist to these lakes with the exception of the trail to Cat Creek Lake No. 1; but, small trails are generally found surrounding each lake, indicating angling and hiking pressure. Cat Creek Lake No. 2 is shallow (<2 m) and will require additional observations to determine future stocking requests. Red Mountain Lake No. 2 appeared sufficiently deep for fish survival, but no fish were observed. It will also be checked for future stocking requests.

The lakes in Queens, Little Queens and Johnson Creek were observed by several individuals from Washington State, and they supplied the following data for use in the Mountain Lakes Management Program (Tables 3 and 4).

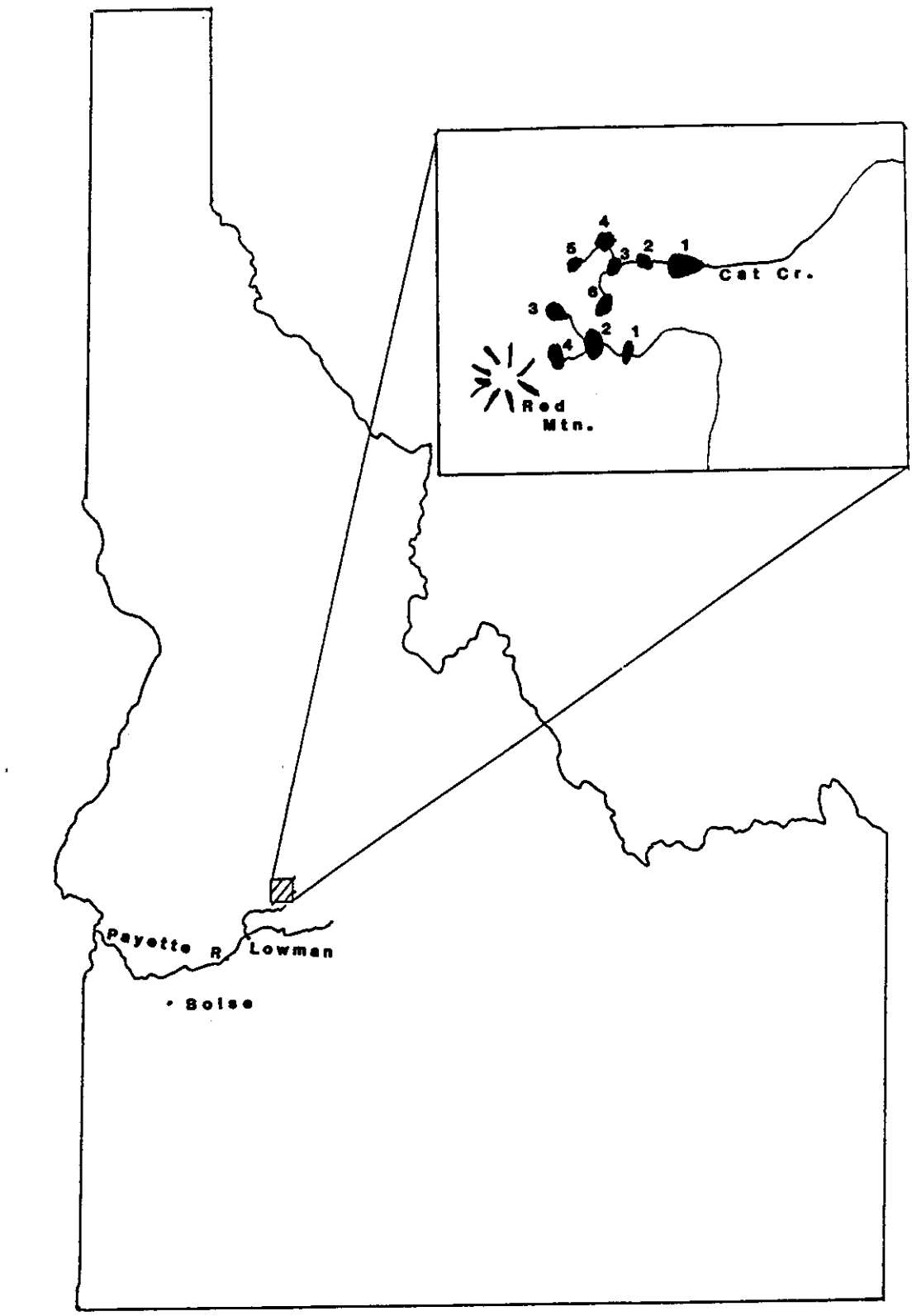

Figure 1. Location map of investigated Red Mountain Lakes and Cat Creek Lakes, 1986.

Table 1. Cutthroat fry stocked in the Cat Creek and Red Mountain lakes in 1986.

	Lake	Number of cutthroat	Fry observed (Y/N)
Cat Creek	1	1,500	Y
	2	1,500	Y
	3	1,500	Y
	4	1,500	Y
	5	1,500	N
	6	---	N
Red Mountain	1	---	Y
	2	1,500	N
	3	1,500	N
	4	---	N
	5	---	N

Table 2. Summary of data collected from Cat Creek and Red Mountain lakes, 1988.

Lake	Fish species (mm)	Fish/ hr	Use[a]	Miles hiked[b]	Spawning gravel	Observations
Cat Cr. 1	CT (300-450) RB (150-200)	<.5 <.5	M-H	5	INLET (10-11)	Stocked with 1,500 CT fry in 1986. Camping in outlet.
Cat Cr. 2	CT (25-40)	0	L	5.5	NONE	Appears to winterkill with an average depth <2 m. Stocked with 1,500 CT fry in 1986.
Cat Cr. 3	CT (25-40)	0	L	6.0	NONE	Stocked with 1,500 CT fry in 1986. No fish observed. Camping near inlet.
Cat Cr. 4	CT(150-250)	5.0	L	6.5	OUTLET	Stocked with 1,500 CT fry in 1986. No camping near lake.
Cat Cr. 5	CT(150-225)	>5.0	L	6.5	NONE	Stocked with 1,500 CT fry in 1986.
Cat Cr. 6	CT(175)	>5.0	L	6.5	NONE	Stocked with 1,500 CT fry in 1986.
Red Mtn. 1	CT(200-330)	3.0	M	7.5	OUTLET	Natural CT reproduction. No trail.
Red Mtn. 2	None seen	0	M	7.2	NONE	Stocked with 1,500 CT fry in 1986. No trail. Several camping sites.
Red Mtn. 3	CT(250)	>5.0	M	7.5	NONE	Stocked with 1,500 CT in 1986. No trail.
Red Mtn. 4	CT(180-310)	>5.0	M	7.5	NONE	No trail; camping near outlet.

[a] L = low; M = moderate.
[b] From trailhead at Clear Creek and through the Cat Creek drainage.

Table 3. Summary of data collected from mountain lakes in 1986.

Lake	Fish species (mm)	Use[a]	Miles hiked	Spawning gravel	Observations
Arrowhead	CT (200-280)	M	12	INLET	Fish in good condition.
Azure	CT (<150-305) Golden (215-460)	L	1	OUTLET	One large golden observed. Most fish 250 mm.
Browns	CT (270)	L-M	9.5	INLET	Camping near inlet.
Diamond	CT (200-330)	L-M	9.5	NONE LOCATED	Camping near inlet.
Everly	CT (330)	L-M	13	EASTERN INLET	Low catch rates.
Lake 8202	CT (100-380)	L	11	OUTLET	Many fish; good shoreline cover.
Lower Scenic	CT (450-330)	L-M	9	OUTLET	Spawning observed in outlet; numerous fish.
Pats	CT (<150-280)	M	11	INLET	Many sizes of fish seen. Camping north and west.
Plummer	CT (100-420)	M	14	OUTLET-INLET	One fish at outlet whirling. A dead fish observed at outlet and another 100 m downstream.
Triangle	CT (200-300)		9.5	OUTLET	Fish in medium condition. CT observed spawning in outlet.
Upper Scenic	CT (<150-330)	L-M	9.5	NONE LOCATED	Limited camping; better at Lower Scenic.

[a]L = light; M = moderate.

Table 4. Summary of locations and sizes of mountain lakes independently studied in 1986. (Data collected by Gerry and Juel Erickson and Dave and Mary Oliver.)

Lake	Township	Range	Section	Approximate size ha	(acres)	Drainage
Arrowhead	7N.	11E.	1	10.1	(25)	Johnson Creek
Azure	7N.	11E.	1	14.2	(35)	Johnson Creek
Browns	7N.	11E.	23	16.2	(40)	L. Queens River
Diamond	7N.	11E.	23	6.1	(15)	L. Queens River
Everly	7N.	12E.	8	16.2	(40)	Benedict Creek
Lake 8202	7N.	12E.	17	10.1	(25)	Queens River
Lower Scenic	7N.	11E.	35	12.2	(30)	L. Queens River
Pats	7N.	11E.	1	10.1	(25)	Johnson Creek
Plummer	7N.	12E.	8	14.2	(35)	Queens River
Triangle	7N.	11E.	23	6.1	(15)	L. Queens River
Upper Scenic	7N.	11E.	35	12.2	(30)	L. Queens River

JOB PERFORMANCE REPORT

State: Idaho

Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-11

Job No.: 3(GC)-b

Title: Region 3 (Boise) Lowland Lakes and Reservoirs Investigations

Period Covered: July 1, 1986 to June 30, 1987

ABSTRACT

We estimated the proportional stock density (PSD) for largemouth bass sampled from Paddock Reservoir at 29 and the relative weight (W_r) near 100 for all length groups. Age class 3 largemouth bass dominated the population with 73% of the sample.

At Deadwood Reservoir, we sampled a relative abundance of game fish and continued the monitoring of kokanee growth. We also estimated spawning potential of Deadwood Reservoir tributaries other than the Deadwood River.

Fish habitat structures were placed in three reservoirs in southeastern Idaho in 1986. Automobile tires, Christmas trees and tree stumps were used. The structures were situated to concentrate and attract fish in two reservoirs and to provide protection for young-of-the-year fish in the third reservoir. Volunteers provided most of the materials and man-hours for construction. Depth and turbidity of waters limited sampling success, but anglers indicated that catch-per-unit effort was greater near these structures.

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OBJECTIVES

To obtain angler use and harvest, species composition, relative abundance, age structure and other life history data for fish populations in selected lowland lakes and reservoirs within the boundaries of the Idaho Department of Fish and Game's Region 3(GC).

RECOMMENDATIONS

1. Continue evaluation of black bass response to the 12-inch minimum size restriction.

2. Establish forage species in Paddock Reservoir as food source for largemouth bass.

3. Continue habitat improvement program at C.J. Strike Reservoir, Lake Lowell and selected small ponds.

4. Initiate a habitat improvement program at Paddock Reservoir.

5. Continue operation of the kokanee migration barrier on Deadwood River. Monitor growth rates every other year to determine rate of escapement needed to maintain 12 to 14 inch four-year-old kokanee.

TECHNIQUES USED

Paddock Reservoir

At Paddock Reservoir, we continued monitoring the largemouth bass population to document impacts of a 12-inch minimum length limit. The Idaho Department of Fish and Game Commission first implemented the 12-inch minimum length restriction at Paddock Reservoir in 1983.

Sampling largemouth bass populations involved the use of a boat-mounted electrofishing unit consisting of a 3.5 kw generator, a Coffelt VVP-2E pulsator, a single negative electrode and a single mobile positive electrode, which also served as a dip net. We held all captured fish in a 90-gallon live well.

From each largemouth bass captured, we obtained a total length measurement (in millimeters). We also obtained a subsample of largemouth bass weights (in grams) and scale samples (for age and growth). We calculated the PSD (Weithman and Anderson 1978) and plotted length frequency from the length data. Weight measurements provided data for computing relative weight (Wege and Anderson 1978).

We determined age and growth rates for the population by dry mounting the scales and reading growth increments from a 10x microfiche projector. Growth rates were back-calculated by standard linear regression.

Deadwood Reservoir

At Deadwood Reservoir, we continued efforts to monitor the kokanee salmon population response to the spawning migration barrier placed across the Deadwood River. During September, we set six experimental rigged horizontal gill nets. We set three nets on the surface and three nets near the bottom of the reservoir. Nets remained in the water for a total time of 48 hours. We counted all fish captured by species, obtained a total length measurement for all game fish and collected otoliths from all captured kokanee.

To better understand kokanee recruitment potential to Deadwood Reservoir, Department personnel surveyed west side tributaries. Riding a mountain bike, the surveyor followed a nearby trail around the western side of the reservoir. At each tributary, he walked from the reservoir upstream and recorded all kokanee sightings. The surveyor also made a subjective estimate of the quality of spawning gravel in the stream.

Lowland Ponds

In five ponds, we electrofished shorelines to enumerate fish species and recorded lengths, weights and collected scales from game fish. Factors that limited fish numbers, density, or size were collected, as well as factors limiting angler access and success. Data collection is continuing and will be included in the 1987 to 1988 annual report.

Habitat Improvement

Volunteer efforts and donations were offered by individuals from the Idaho Bass Federation and other interested parties to install artificial fish structures in reservoirs in southwestern Idaho. These structures were constructed using discarded automobile tires, Christmas trees (without flocking or tinsel) and apple tree stumps (generally 1 m tall and butts 30 cm to 70 cm in diameter). Materials for structures were placed on or near the ice at Deer Flat Refuge (Lake Lowell), C.J. Strike Reservoir and Indian Creek Reservoir.

Other

Conservation officers from the Boise and Weiser districts supplied catch rates and harvested species composition data gathered from spot creel checks.

FINDINGS

Paddock Reservoir

At Paddock Reservoir, we sampled a total of 397 captured largemouth bass ranging from 55 mm to 320 mm in total length. We calculated a mean sample length of 228 mm (Fig. 1). Only seven of the 397 largemouth bass sampled measured 305 mm (12 inches) or greater. The length frequency histogram displays modes at 180 mm, 230 mm and 270 mm. Largemouth bass at or near 230 mm dominated the catch. We sampled very few fish under 100 mm in total length. Using this length data, we calculated a proportional stock density of 29 and a relative stock density for largemouth bass 15 inches or larger (RSD_{15}) of O. Length frequency data collected in 1984 indicated a PSD of 21 and an $RSD_{1}5$ of 8 (Reid 1985).

Largemouth bass in the sample varied in weight from 30 g to 400 g. We calculated a mean sample weight of 158 g. The relative weight approached near ideal (100) for all length groups, declining slightly with increasing length (Fig. 2). Relative weights calculated from 1984 data displayed a sharp decline in largemouth bass condition for fish 180 mm or larger.

From the largemouth bass sample, we obtained 77 readable scales for age and growth analysis. In the sample, we observed one age 1 largemouth bass, 20 age 2, 51 age 3 and 5 age 4. The age frequency histogram for the 1986 largemouth bass sample indicates that nearly 73% lie in age group 3 (Fig. 3). Annual growth increments vary from 69 mm of growth between age 1 and age 2 to 35 mm between age 3 and age 4 (Table 1). Growth rate point estimates for largemouth bass sampled in 1986 indicate a slight reduction in growth from fish sampled in 1984. However, we found no statistical differences between the samples.

There appears to be little difference in the PSD of Paddock Reservoir largemouth bass between samples taken in 1984 and 1986. The 1986 length frequency histogram does indicate a severe reduction in year class strength for all age classes other than age 3. The lack of age 1 and age 2 largemouth bass could indicate a cannibalistic problem within the largemouth bass population.

Deadwood Reservoir

Gill nets set in Deadwood Reservoir captured 73 kokanee, 17 cutthroat trout, 14 fall chinook, 12 rainbow trout, 128 mountain whitefish and 2 redside shiners. Kokanee in the sample ranged in total length from 160 mm to 390 mm with a mean length of 213 mm. The length frequency histogram indicates a strong mode at 200 mm (Fig. 4). Age 1 kokanee in the sample varied in total length from 160 mm to 180 mm, age 2 from 190 mm to 220 mm and age 3 from 230 mm to 310 mm. We captured one age 4 kokanee that had

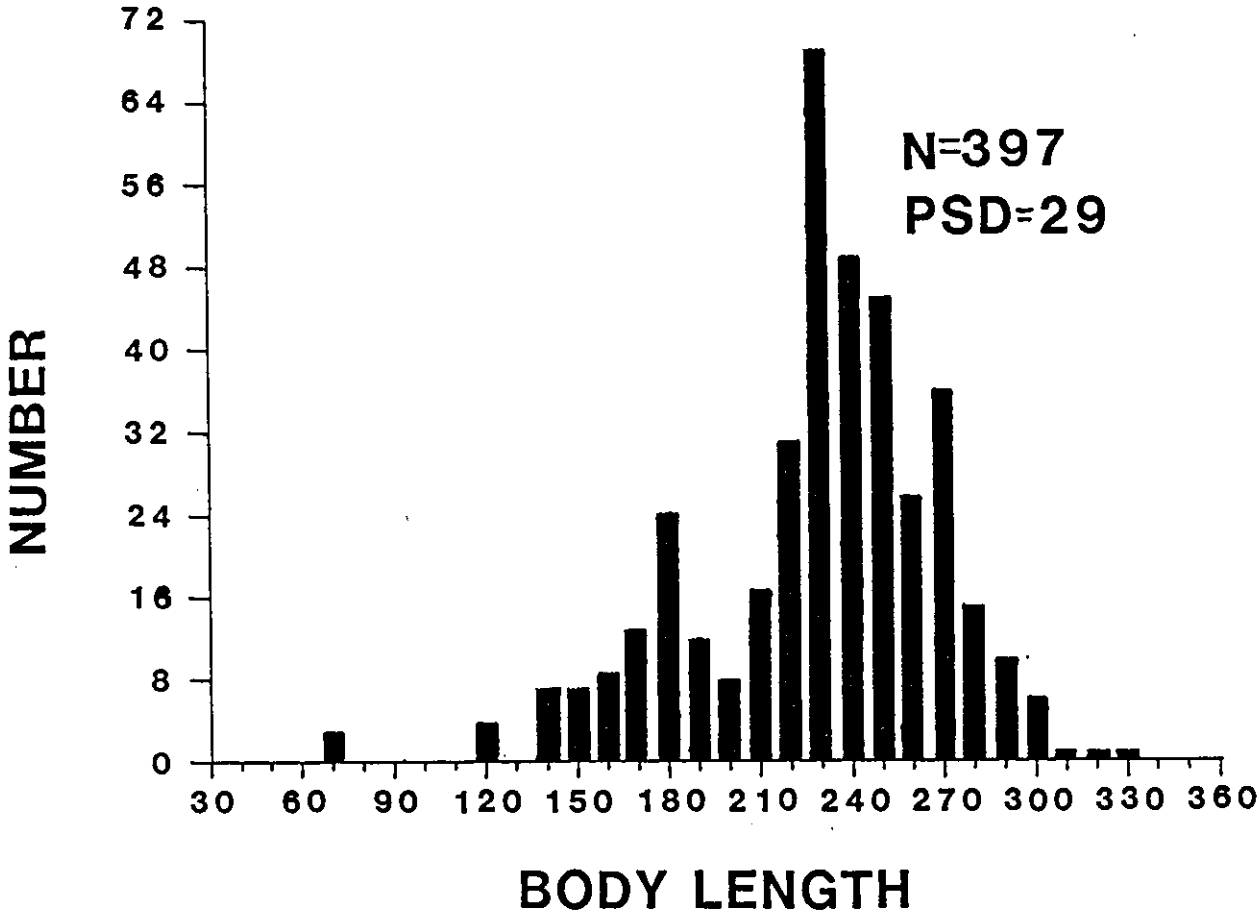

Figure 1. Length frequency and PSD of largemouth bass sampled, Paddock Reservoir, 1986.

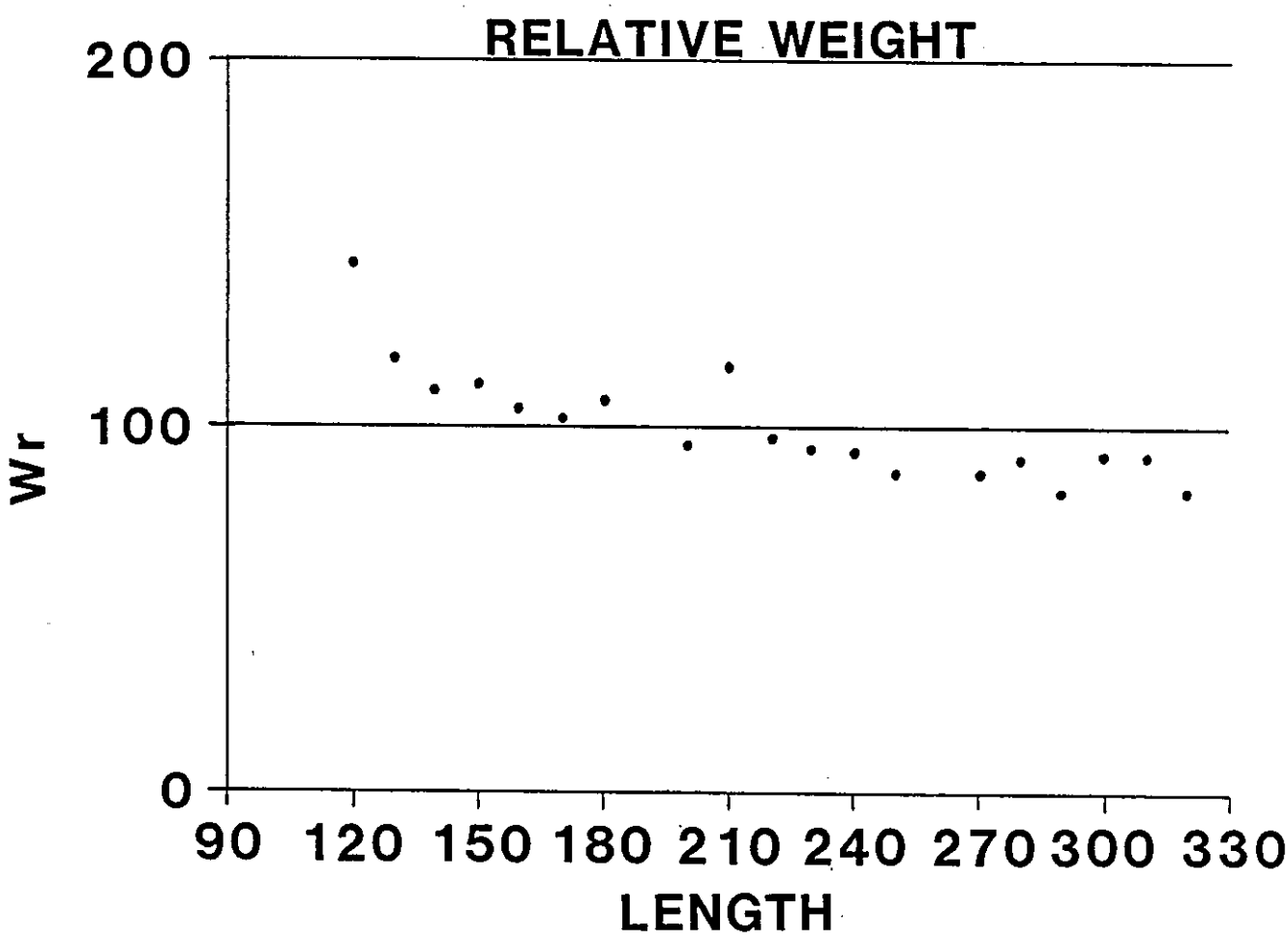

Figure 2. Relative weight of largemouth bass sampled, Paddock Reservoir, 1986.

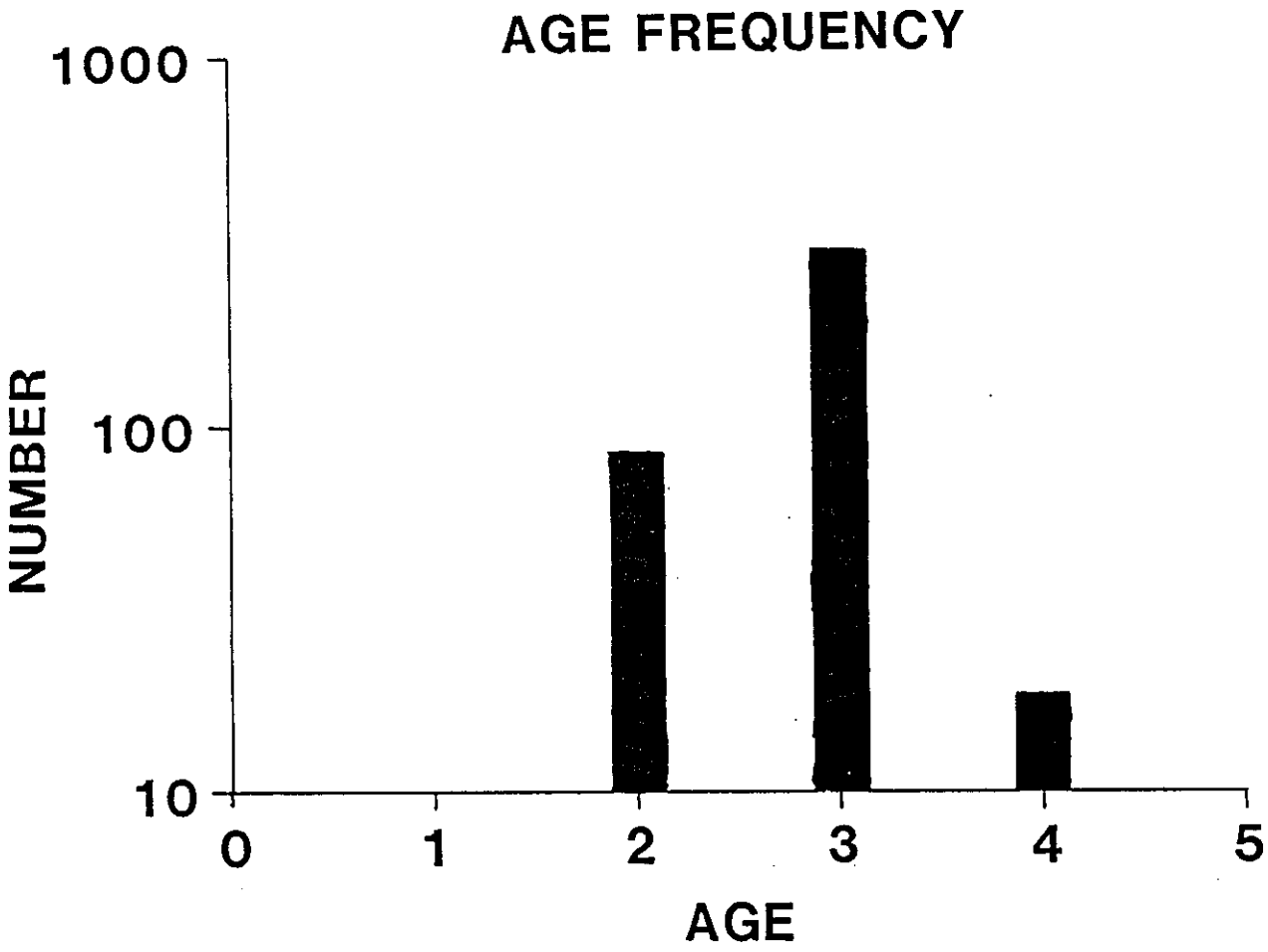

Figure 3. Age frequency of largemouth bass sampled, Paddock Reservoir, 1986.

Table 1. Growth rates of largemouth bass by age class, Paddock Reservoir, 1984 and 1986.

	Age						
	I	II	III	IV	V	VI	VII
1984							
Length	77.6	164	231	290	343	391	466
Growth	86	67	59	55	48	75	
CI±	24	44	59	74	90	93	38
1986							
Length	119	188	234	365			
Growth	69	46	35				
CI±	27	31	34	56			

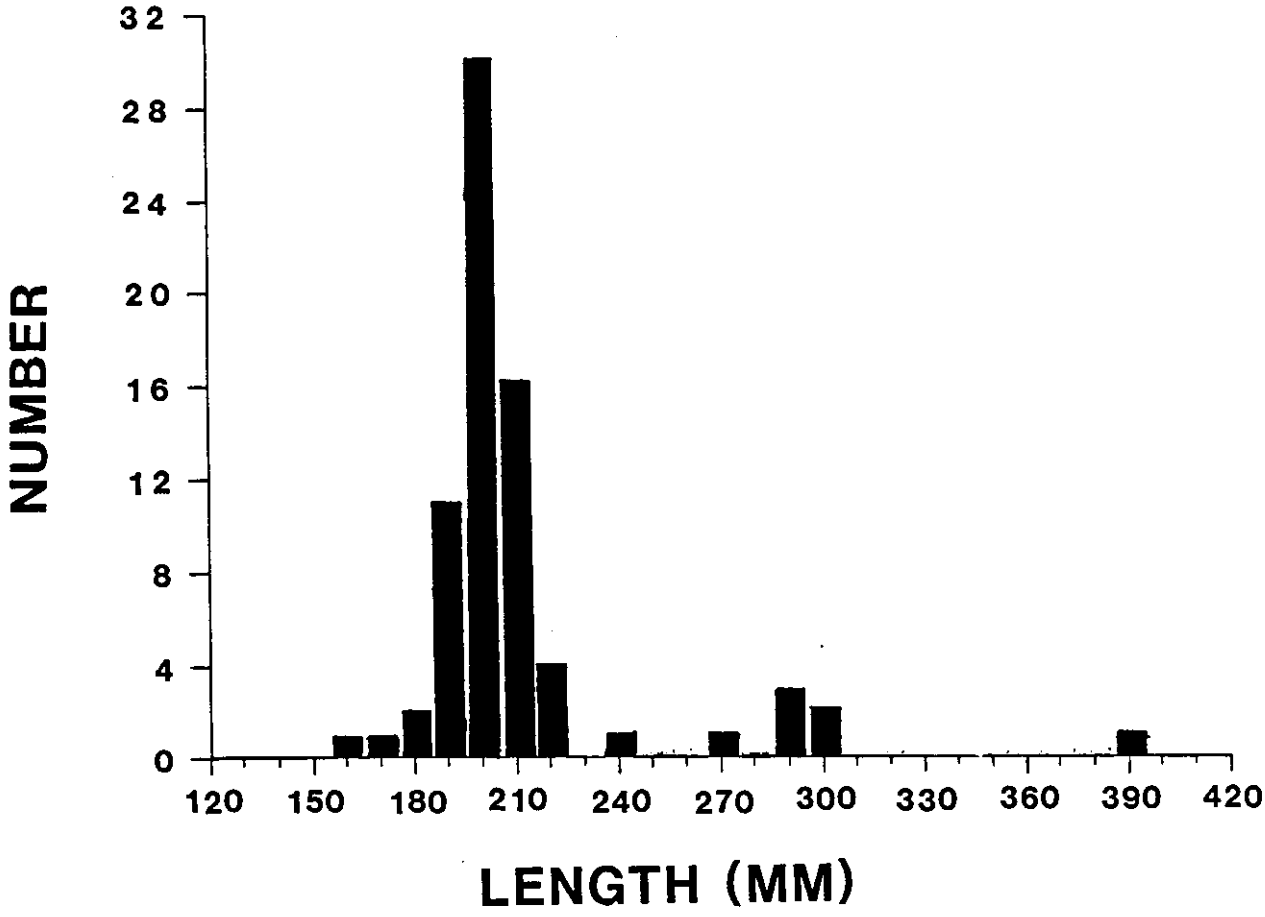

Figure 4. Length frequency of kokanee salmon sampled, Deadwood Reservoir, 1986.

just completed spawning. At Deadwood River, Eagle Hatchery personnel trapped approximately 1,000 mature kokanee and spawned 235. Spawned kokanee varied in total length, ranging from 228 mm to 387 mm (Robert Esselman, IDFG, personal communication).

Region 3 personnel found spawning kokanee in four of eight to Deadwood Reservoir tributaries. In streams without kokanee spawners, we found flows or migration barriers that prevented passage (Table 2). Only Wildbuck Creek had large amounts of suitable spawning material. All other streams surveyed had extreme sedimentation.

Habitat Improvement

Automobile tires and tree stumps were used for structures in Lake Lowell. Approximately 800 tires and 44 tree stumps were transported to Lake Lowell using private, refuge and Department vehicles. Deer Flat employees also transported a load of sand to be placed in bags for weight to our supply and staging area. Bass Club members had cement donated by local cement companies poured in 5-gallon plastic buckets, which were also available for sinking the structures.

Snow machines and three-wheel, all-terrain vehicles were used to transport stumps, trees and weights onto the ice, using car hoods as sleds. Structures were placed on ice over water 6 m to 8 m deep.

When on the ice, tires were formed in groups of 24 (Fig. 5). Holes were drilled (with carbon-tipped drills) into the sides or ends of tires, depending on a tire's location within the structure. Tires were then connected with a single strand of 12.5-gauge galvanized wire, making certain that the drilled holes were placed upward for air drainage. Weights were attached to corners of the structure to prevent drifting. Tree stumps were positioned in a ring with large nails driven into the sides of the stumps to secure the wire (Fig. 6). Weights were placed in the center of a tree stump ring attached by 12.5-gauge wire.

Artificial habitat work on Lake Lowell entailed the efforts of 60 volunteers over a period of nearly 2 weeks for an estimated 600 hours of time. During the summer of 1986, attempts were made to sample this structure, but the water was too deep for effective sampling. Personal communication with local anglers indicated black crappie and largemouth bass were caught with good success during low water.

C.J. Strike Reservoir

Nearly 500 Christmas trees were placed in a straight line on the ice over water about 3 m deep. The trees were interconnected with galvanized wire and weights, which consisted of bags filled with sand or 5-gallon buckets filled with cement (Fig. 7). Tires structures similar to Lake Lowell were built, with Christmas trees attached. This work used 24 volunteers that donated nearly 250 man-hours (Table 3). Structures were located in 3 m to 4 m of turbid water, preventing successful sampling in the summer of 1986.

Table 2. Kokanee spawning activity in Deadwood Reservoir tributaries, 1986.

Stream	Kokanee present	Spawning gravel present	Observations
Wild Buck	yes	yes	Good gravel, clean fish;
Habit Creek	no	yes	migration limited by shallow water.
N. F. Beaver	no	yes	Shallow water, fair gravel; possible migration barrier
Beaver Creek	yes	yes	Fair gravel, much sand in system.
W. F. Beaver	no	no	Extreme sediment load in stream; barrier at high water line.
S. F. Beaver	yes	yes	Poor gravel; extreme sediment load; 1 kokanee observed.
Moulding Creek	no	no	Extreme sediment load.
Trail Creek	yes	yes	Sparse gravel in fair condition; good stream flow.

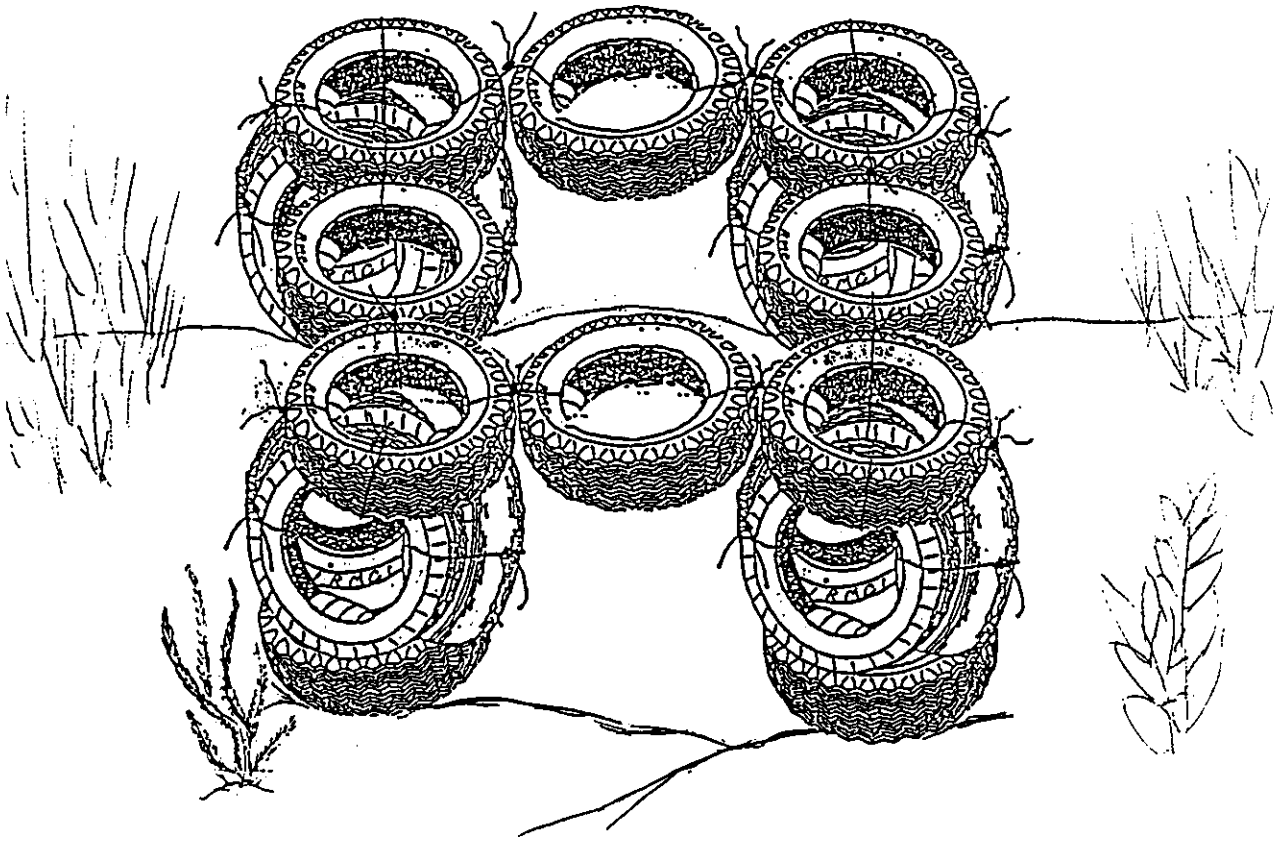

Figure 5. Tire structures placed in Lake Lowell and C.J. Strike Reservoir, 1986.

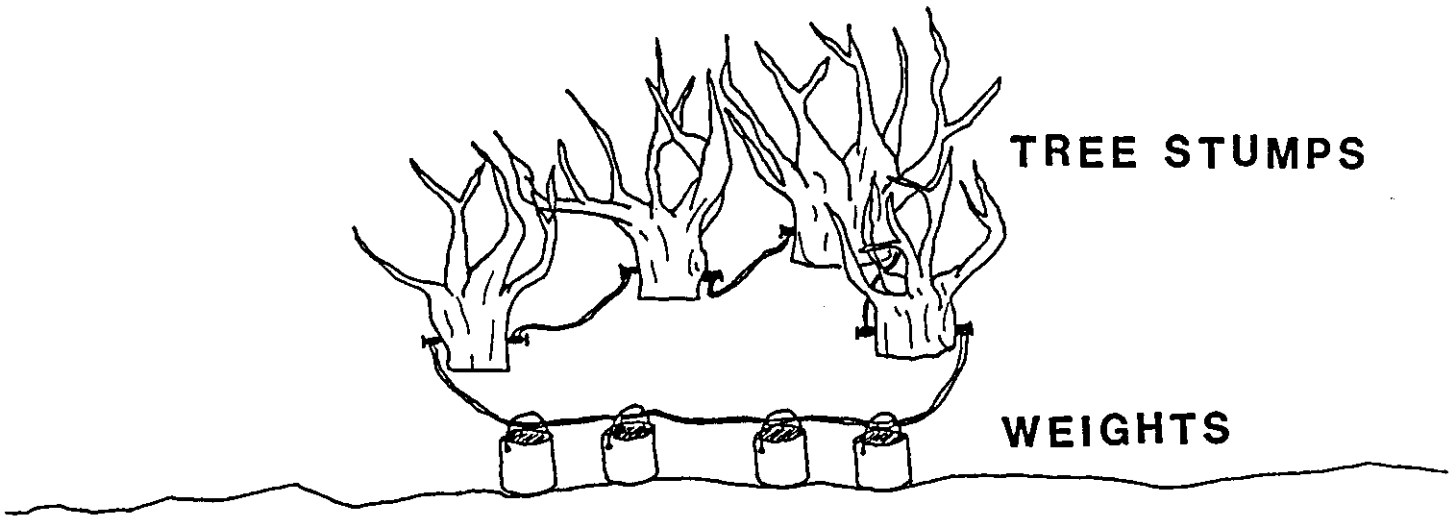

Figure 6. Tree stump structure placed in Lake Lowell, 1986.

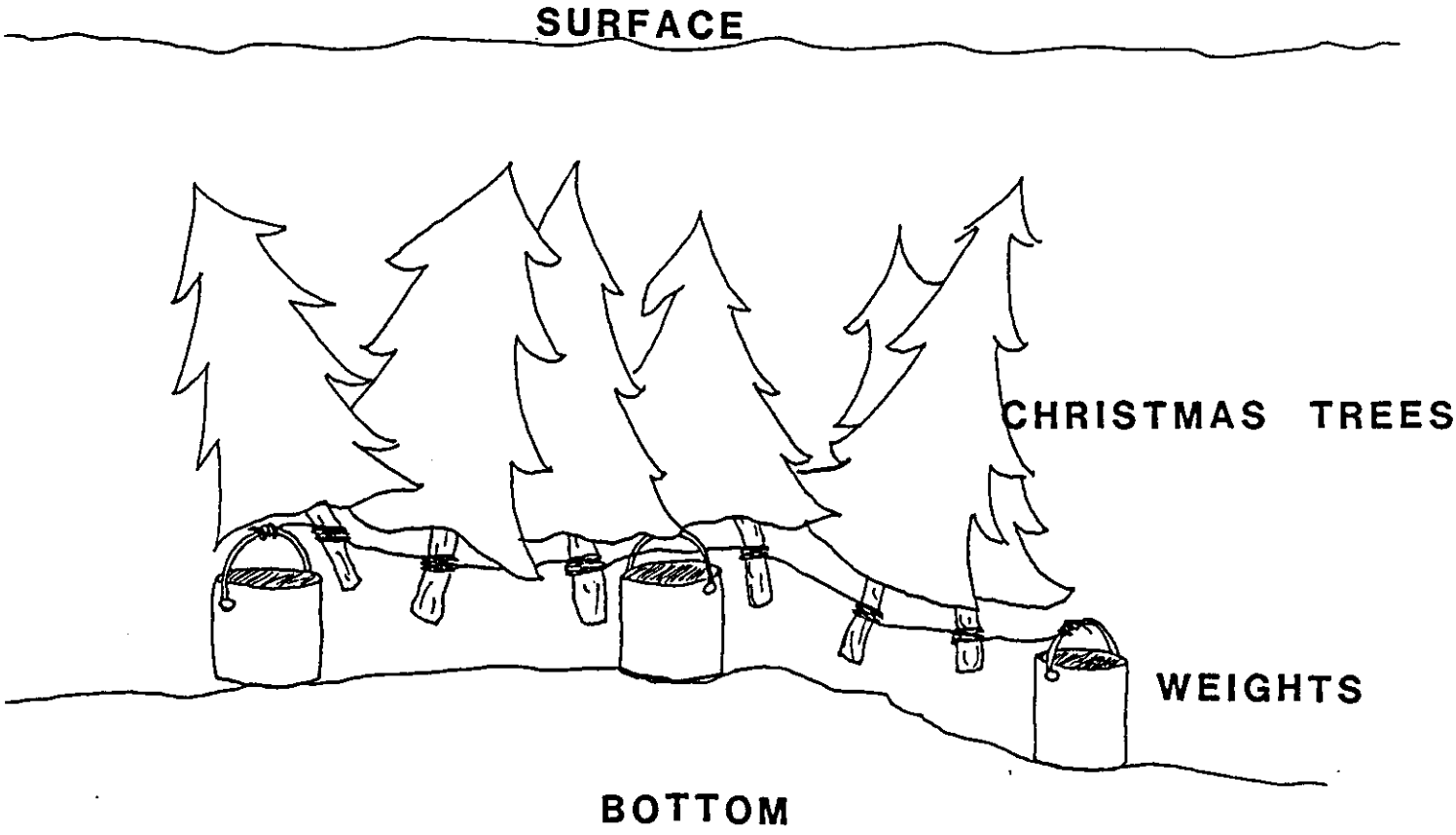

Figure 7. Christmas tree structures placed in C.J. Strike and Indian Creek reservoirs, 1986.

Table 3. Summary of fish habitat structures placed in Region 3 (GC) lowland lakes and reservoirs, 1986.

Date	Water	Materials	Number of volunteers	Volunteer hours
Jan 2-11	Lake Lowell	800 car tires 44 tree stumps	60	600
Jan 13-25	C.J. Strike Reservoir	500 Christmas trees 500 car tires	24	250
Jan 31-	Indian Creek Reservoir	200 Christmas trees	8	50

Indian Creek Reservoir

Approximately 200 Christmas trees were placed in a straight line at the shoreline and ice interface. The trees were connected similiar to those at C. J. Strike Reservoir. Eight individuals volunteered nearly 50 man-hours of time in this habitat construction. Attempts were made to sample this structure during the summer of 1986, but the turbidity and depth of water over the structure prevented effective sampling.

Other

Miscellaneous creel data supplied by Region 3 conservation officers from spot checks is summarized and presented in Tables 4 and 5.

Table 4. Species composition [percentage of catch] of selected Region 3 [GC] lowland lakes and reservoirs, 1988. [TR = trace.]

Water	Catch	Hrs.	Species composition (%)														
			WRB	HRB	KOK	CH	DV	BT	CT	WF	LMB	SMB	CC	BH	CR	YP	BG	PS
Arrowrock	304	772	16	62	TR		2		TR	TR		7				13		
Lucky Peak	820	1,964	31	67		1				.6						.4		
C.J. Strike	283	838		19						.4	5	19	1	20	.6	25	10	
Crane Falls	669	480		9						TR	19			2	4		41	25
Halvorsen Pond	70	29															100	
Deadwood Res.	113	139	12		75	2			11									
Tripod Res.	191	158		99				1										
Horseshoe Bend	163	263		86										13			1	
Sagehen	252	407	38	62														
Lake Lowell	89	156		1							24	1		2	3	21	48	
Caldwell Pond	22	76		27							9			5			59	
State Pond (Caldwell)	121	60									6			8			86	
Brownlee Res.	114	239	8	4								38	5		41	4		

Legend:

HRB = hatchery rainbow trout
WRB = wild rainbow trout
KOK = kokanee
CH = fall chinook
DV = Dolly Varden
BT = brook trout
CT = cutthroat trout
WF = whitefish
LMB = largemouth bass
SMB = smallmouth bass
CC = channel catfish
BH = bullhead catfish
CR = crappie
YP = yellow perch
PS = pumpkinseed sunfish
BG = bluegill sunfish

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Table 5. Catch statistics for selected Region 3 (GC) lowland lakes and reservoirs, 1986.

Water	Catch	Hours	Fish/hr	Fish/angler
Arrowrock	304	772	0.39	1.12
Lucky Peak	820	1964	0.42	1.07
C.J. Strike	283	828	0.34	1.15
Crane Falls	669	480	1.39	5.53
Halvorsen Pond	70	29	2.41	7.78
Deadwood Res.	113	139	0.81	1.95
Tripod Res.	191	158	1.21	4.44
Horseshoe Bend	163	263	0.62	0.97
Sagehen	252	407	0.62	3.50
Lake Lowell	89	156	0.57	1.00
Caldwell Pond	22	76	0.29	0.49
State Pond (Caldwell)	121	60	2.02	3.78
Brownlee Res.	114	239	0.48	2.07

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JOB PERFORMANCE REPORT

State: Idaho

Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-11

Title: Region 3 (Boise) River and Stream Investigations

Job No.: 3(GC)-c

Period Covered: July 1, 1986 to June 30, 1987

ABSTRACT

From March 1, 1986 through January 2, 1987, anglers fishing the Boise River expended an estimated 50,984 hours to harvest 23,188 game fish. Rainbow trout made up the majority of fish in the creel with 78Z of the total catch. Anglers interviewed indicated a weak positive reaction for quality trout designation and a strong positive reaction to the current program.

Electrofishing data collected from the Payette River downstream from Black Canyon Dam revealed a total absence of brown trout. Mountain whitefish comprised the bulk of the game fish biomass in the lower Payette River.

Mark and recapture efforts on the Snake River indicated a substantial population of white sturgeon between Swan Falls Dam and Walters Ferry, Idaho. We found very little diurnal or seasonal difference in the catchability of white sturgeon.

Upper sections of the middle forks of the Boise and Payette rivers were snorkeled in August of 1986. Game fish compositions generally changed from predominantly wild rainbow to hatchery rainbow and mountain whitefish as snorkeling continued downstream. Substrate in Middle Fork Boise River showed little change, but Middle Fork Payette River changed from 20 mm to 150 mm rocks to nearly 100% sand.

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RECOMMENDATIONS

1. Initiate a habitat improvement program for the Boise River with the Boise City-Garden City, City Limits to increase adult rearing habitat.

2. Initiate a stream habitat improvement program on side channels to the Boise River to improve salmonid spawning.

3. Continue to work with Boise City and Garden City to stabilize Boise River streambanks and provide riparian set back.

4. Continue to explore the feasibility of establishing a trophy trout section for the Boise River near the City of Boise.

5. Increase frequency of catchable trout plants in Boise River. Continue to plant steelhead or large trout as available.

6. Conduct an angler use, harvest and opinion survey on the South Fork Boise River downstream from Anderson Ranch Dam.

7. Expand white sturgeon evaluation to better define habitat, water quality needs and movement between C.J. Strike Dam and Swan Falls Pool and between C.J. Strike Dam and Brownlee Pool.

TECHNIQUES USED

Boise River

From March 1, 1986 to January 2, 1987, a census clerk conducted an angler use and harvest survey of the Boise River within the metropolitan area of the City of Boise and Garden City, Idaho (Fig. 1). The study area encompassed approximately 11 river miles from Barber Park downstream to Glenwood Bridge. To ensure an instantaneous count of anglers, we divided the study area into four equal sections.

The study period was divided into eleven 28-day intervals. Within each 28-day interval, we treated weekdays and weekend days separately. (Holidays were included in weekend counts.) From each 28-day interval, we randomly selected four weekdays and four weekend days to count. We systematically selected two time periods within each randomly selected cluster to start counts, with random start times assumed. Due to limited

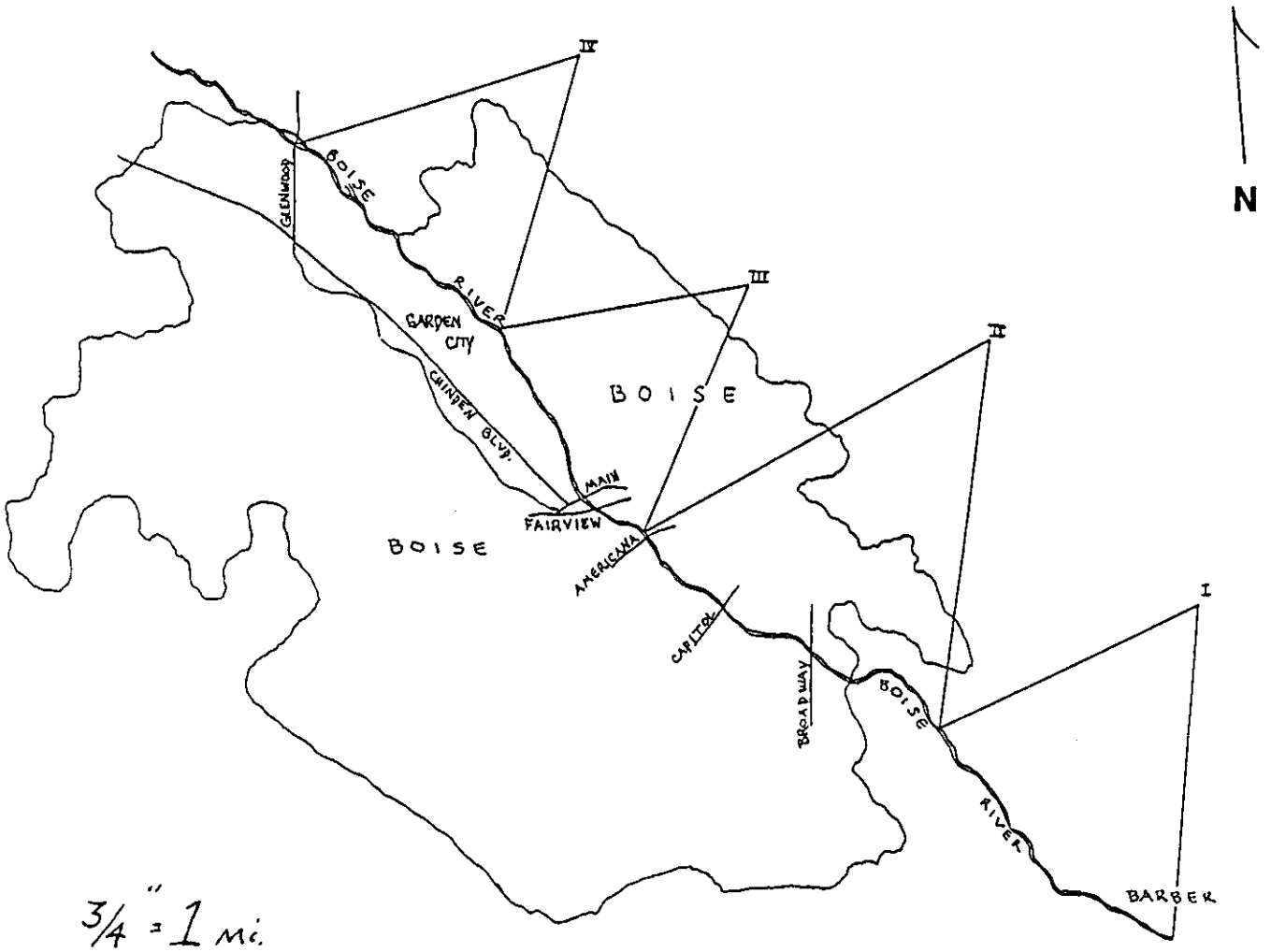

Figure 1. Location map of Boise River creel survey, 1986.

motor vehicle river access, the clerk made all downstream counts with a kayak, using a bicycle to shuttle back to the starting point. The time involved to complete one round trip dictated the number of angler counts made in one day.

During each count, the census clerk would enumerate all anglers observed according to river section. I estimated hours of use by the expansion of mean anglers per count, times daylight hours, times the number of days in an interval.

On noncount days, the census clerk interviewed all anglers encountered to obtain angler harvest and angler preferance information. He asked each angler for hours fished, license type, terminal tackel used, current management ratings (from one to five), desirability of a quality river reach and general comments (Table 1). In some cases, an angler would require an explanation of the term "quality". In such cases, thE census clerk would explain that a quality designation would restrict harvest and limit terminal tackle to artificial lures and flies only. To obtain an indicator for current management practices, the census clerk asked each angler to rate the current program from one to five, with one equal to poor and five equal to excellent.

Table 1. Questionnaire used for angler preference survey, Boise River, 1986.

1. On a scale from one to five, how would you rate the current management of the Boise River by the Idaho Department of Fish and Game? (Five is the highest rating, one the lowest.)

3. Would you favor the development of a quality fishing area on the Bois' River? (This may include reduced bag limits, size restrictions an, terminal tackle restrictions.)

4. If you would favor a quality trout reach on the Boise River, which: reach would you like to see designated as quality?

Payette River

Personnel from the Idaho Department of Fish and Game used a 3.5 k generator to supply power to a Coffelt WP-2E pulsator to electrofish the Payette River downstream from Black Canyon Dam. We mounted all equipment in a 16 ft aluminum river sled. We used a mobile positive electrode--which also served as the capture net--with a fixed negative electrode.

Snake River

Idaho Department of Fish and Game personnel and volunteers used rod and reel to capture white sturgeon from the Snake River between Swan Falls Dam and Walters Ferry, a distance of about six river miles. Due to a low rate of recapture, we exerted maximum effort within a three-mile reach.

The study site lies within the Snake River Birds of Prey Natural Area and flows through a steep-walled canyon. River gradients vary from shallow to moderate. Pool depths in the canyon varied from 20 to 40 feet deep, with runs ranging from 10 to 15 feet deep. Substrate appeared to be composed of sand, gravel and cobble.

Using the Schnabel mark and recapture technique, we attempted a population estimate for the three miles of river fished intensively. However, due to the time involved (one year) to obtain recaptures, the estimate is unreliable.

Middle Forks Boise and Payette Rivers

Idaho Department of Fish and Game personnel conducted snorkel counts on the middle forks of the Payette and Boise rivers to collect trend data on species composition (Fig. 2). When making snorkel counts, we entered the river near the lower end of the transect and kept close to the shoreline. They worked upstream, looking midstream to identify and enumerate the fish.

Surface areas for each transect were measured using the average length and width. Fish densities for each transect were calculated as a ratio of total numbers of fish to the sum of the surface area of the transect.

Other

Idaho Department of Fish and Game personnel obtained spot creel data from selected lowland lakes and reservoirs to monitor species composition in the creel and angler catch rates. This data will assist managers when evaluating the five-year management plan for fishery resources.

FINDINGS

Boise River

Between March 1, 1986 and January 2, 1987, an estimated 50,984 angler hours were expended on the 11-mile reach of Boise River from Barber Park downstream to Glenwood Bridge. Peak angler hours (10,005 hours) occurred during June 16 to July 18 (Table 2). Estimated low use occurred during March 29 to April 25 (629 hours) and March 1 to March 28 (636 hours).

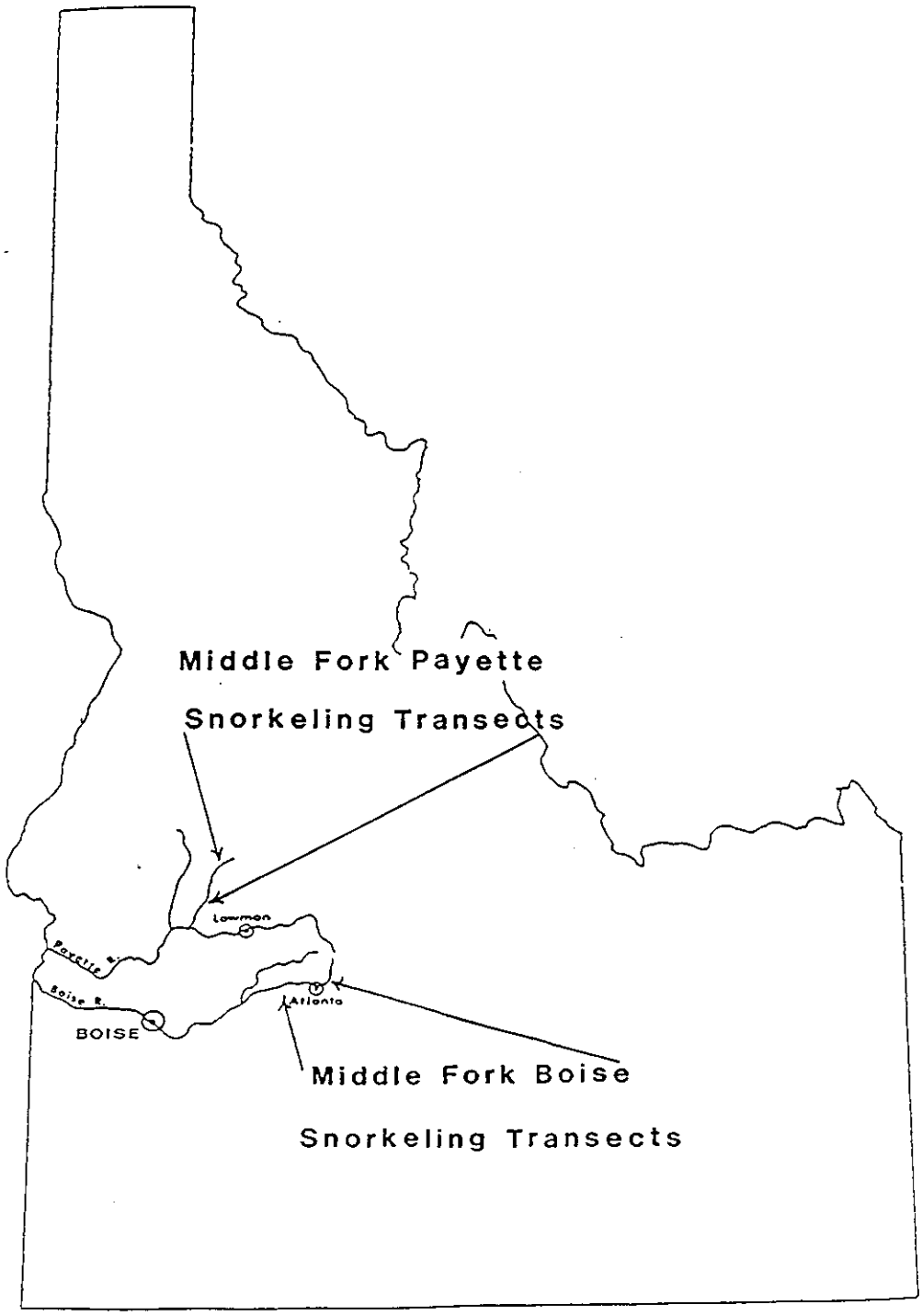

Figure 2. Snorkeling transects on the middle forks of the Boise and Payette rivers, 1986.

Table 2. Boise River angler use and harvest data by 28-day intervals, March 1, 1986 to February 2, 1987.

Interval	Dates	Fish/hour	Hours fished	Harvest
I	3/2-3/28	0.54	636	343
II	3/29-4/25	0.19	629	120
III	4/26-5/23	0.42	2,032	853
IV	5/24-6/20	0.20	1,638	450
V	6/21-7/18	0.40	10,005	4,002
VI	7/19-8/15	0.42	9,052	3,802
VII	8/16-7/12	0.40	7,461	2,984
VII	9/13-10/10	0.93	7,059	6,565
IX	10/19-11/7	0.31	6,925	2,147
X	11/8-12/5	0.23	1,701	390
XI	12/6-1/2	0.43	3,846	1,654
TOTAL		0.46	50,984	23,188

A negative correlation appeared between angler use and river flow (Fig. 3). The number of anglers per count dropped dramatically with flows greater than 1500 cfs. It appeared that anglers preferred flows less than 800 cfs. Angler use was evenly distributed between river count sections, with 26% of the activity occurring in Section 1, 29% in Section 2, 23% in Section 3 and 22% in Section 4.

Anglers fishing the Boise River harvested an estimated 23,188 game fish, a rate of 0.46 fish/hr (Table 3). Rainbow trout stocked by the Department made up 78% of the total harvest. Naturally produced rainbow trout comprised another 10% of harvested fish. Mountain whitefish (9%), brown trout (2%) and transplanted steelhead trout (1%) contributed to the remainder of the harvest. The highest catch rate (0.93 fish/hr) occurred during the interval of September 13 to October 10. The lowest catch rate (0.19 fish/hr) occurred during spring runoff from March 29 to April 25. Catch rates during the remainder of the study period varied from a low of 0.23 fish/hr to 0. 43 fish/hr.

The Idaho Department of Fish and Game stocked a total of 20,859 rainbow trout and 506 steelhead trout into the Boise River during the study period. We estimated that anglers harvested 18,018 (81%) of stocked rainbow trout and 285 (50%) of stocked steelhead trout. Construction of power generating facilities at Lucky Peak Dam neccesitated the release of abnormally high flows during the fall months (intervals IX and X). The autumn high water release occurred shortly after stocking steelhead trout and probably resulted in reduced catch rates. Although we did not continue to collect project data after January 2, incidental reports indicated an increase in'the harvest of steelhead and whitefish after the Bureau of Reclamation reduced flows in the river.

Creel survey personnel collected interview data from a total of 870 anglers fishing the Boise River during the study period. Of that total, 73% used bait as terminal tackle, 17% used lures and 10% fished with artificial flies. Resident license holders made up 942 of the anglers interviewed, 6% carried a nonresident license and 3% had disabled permits. Of the nonresident license holders, 33% carried a season license, 33% a one-day license, 23% a 10-day permit and only 8% had a 3-day license.

Anglers interviewed indicated an acceptance of the current management program on the Boise River. Eighty-one percent of those interviewed gave the current program a rating of four or five (good to excellent), 16% rated it 3 (fair) and 3% gave responses of either 1 or 2 (below average or poor). Of terminal tackle groups, 1% of bait fishermen gave the current management program a rating of poor, 2% responded below average, 16% rated it fair, 45% replied good and 35% rated it excellent. Both lure and fly anglers followed a similar trend with ratings for the two groups of 1% and 0% poor, 2% and 2% below average, 23% and 19% fair, 39% and 45% good and 35% and 34% excellent, respectively.

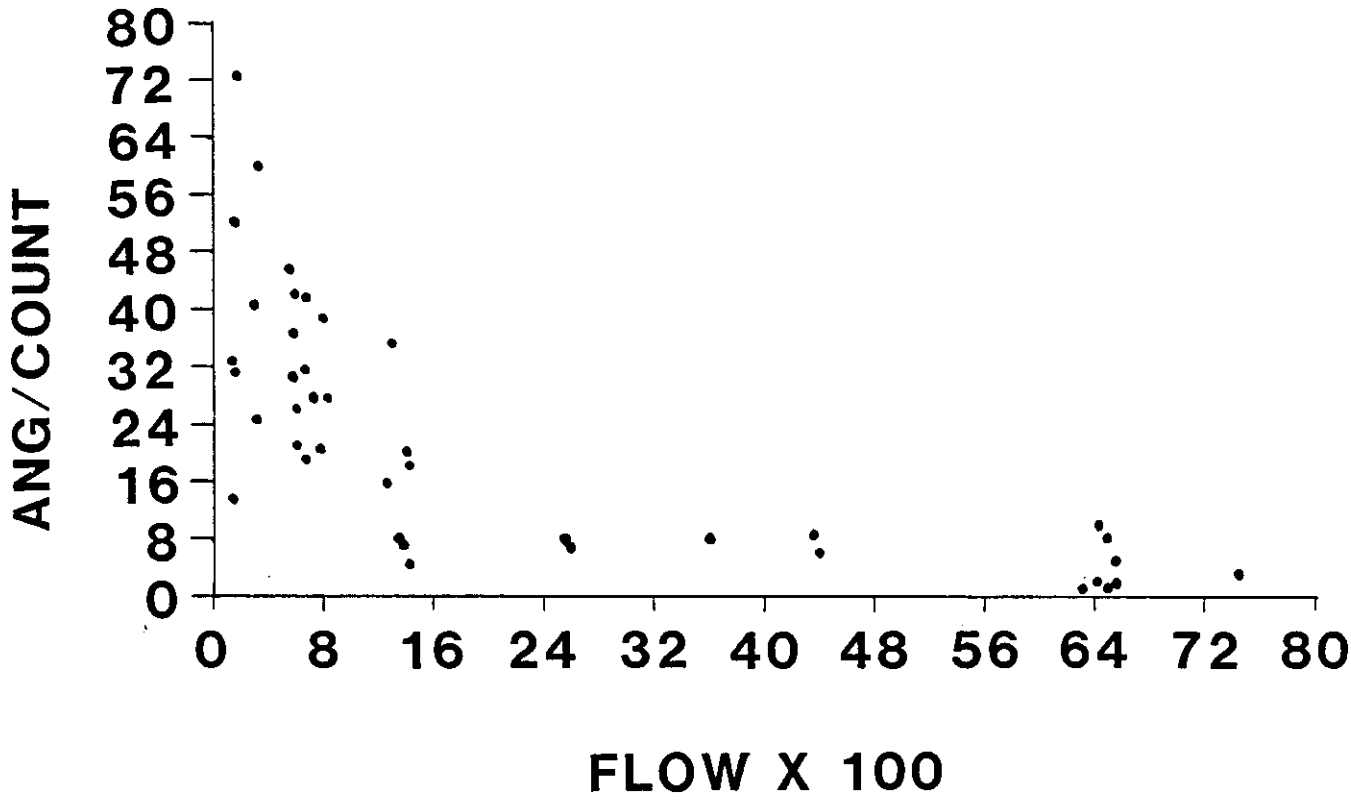

Figure 3. Anglers per count versus Boise River flows, 1986.

Table 3. Boise River species harvest data by 28-day intervals, March 1, 1986 to January 2, 1987.

Interval	Fish/ hour	HRB	WRB	BR	WF	SH	HRB stocked	SH stocked
I	0.54				343			
II	0.19	90				30		
III	0.42	731			122			
IV	0.20	328						
V	0.40	3,627	125	125	125		3,600	
VI	0.42	3,384	190	38	190		3,900	
VII	0.40	2,805	60		119		3,911	
VIII	0.93	4,727	1,641		197		7,976	
IX	0.31	1,632	279	86	64	86		406
X	0.23	231	23	23	43	70	1,170	100
IX	0.43	463	33	83	976	99		302
Total	0.46	18,018	2,351	355	2,179	285	20,859	506

Of the 870 anglers interviewed and asked the question, "Should a portion of the Boise River be managed for quality trout only?", 34% chose not to respond, 27% opposed and 37% favored quality trout designation. Of those responding, bait anglers favored the designation by 59%, lure fishermen by 65% and fly fishermen by 91%. The majority of respondents (53%) stated a preference for designating the river reach from Barber Park to Logger Creek as quality.

In addition to the structured question, we received 355 responses classified as "general comments". The most frequent comment (28%) referred to the amount of trash found in and near the Boise River. Other comments included the following: (1) more fish (10%), (2) less housing development (9%) , (3) negative comments regarding fluctuating flows (10%), and (4) positive comments concerning the steelhead planting program (9%).

Payette River

Electrofishing operations on the Payette River between Black Canyon Dam and the City of Fruitland, Idaho, produced a total capture of 142 game fish. Mountain whitefish made up 43% of the game fish sampled and smallmouth bass, 26%. Other game fish species in the sample included: largemouth bass (11%), pumpkinseed sunfish (12%), bluegill sunfish (7%), black crappie (5%), channel catfish (4%) and bullhead catfish (1%). We did not capture any brown trout during the sampling.

Mountain whitefish in the sample ranged from 120 mm to 365 mm in total length. As we did not measure all mountain whitefish captured, we did not calculate a mean length for the sample. Smallmouth bass in the sample varied from 50 mm to 340 mm in total length. Largemouth bass attained a mean total length of 195 mm.

We collected 15 scale samples from Payette River smallmouth bass with ages varying from 1+ to 5+. Smallmouth bass at age 1+ ranged in length from 130 mm to 165 mm, age 2+ ranged from 245 mm to 300 mm and age 3+ ranged from 300 mm to 330 mm. We did not sample any age 4+ smallmouth bass and captured only one age 5+ at 390 mm in total length. Due to the small sample size, we did not attempt any growth analysis.

Snake River

Idaho Department of Fish and Game personnel and selected volunteers fished 789 hours to capture 42 white sturgeon between Swan Falls Dam and Walters Ferry, Idaho. From February 2, 1986 to February 2, 1987, we captured white sturgeon at a rate of 0.05 fish/hr, or 19 hours/fish. During the study period, we spent considerable time exploring new waters and methods; therefore, catch rates could have been higher. We did not experience any specific time of year when we could not catch white sturgeon. Sturgeon activity was at a peak during spring and fall months.

Only during extremely warm summer months and extremely cold winter months did we experience any difficulty hooking sturgeon. In addition, we did not experience any specific time of day that produced higher catch rates. Areas of greatest feeding activity seemed to occur over a cobble substrate.

Captured white sturgeon ranged in total length from 2.9 ft to 9.4 ft, with a mean length of 7.1 ft. Of the 42 sturgeon sampled, we found three with completely removed tails, one blind and one missing a gill cover.

Based on the Schnabel mark and recapture technique, we obtained a total population estimate of 135 to 173 white sturgeon from the three-mile reach of the Snake River. However, this estimate is undoubtably high, due to the length of time involved (one year) and the lack of information concerning ingress and egress. We did not document any movement between sampling areas as all recaptures came from the original capture site.

Middle Fork Boise River

Study sections in Middle Fork Boise River consisted of seven transects, the first beginning near the old power plant above Atlanta. Transect 7 ends 1.4 miles below Swanholm at Dutch Creek. Each transect 's location and physical landmarks is recorded in the Regional file for future snorkeling.

The further downstream we snorkeled, human activity in the form of mining and camping increased. Fish composition changed from Transect 1 to Transect 7, with decreases in wild fish and increases in both whitefish and hatchery rainbow (Table 4).

The entire stream width was visible in Transect 1 and had only slightly decreased in Transect 7. The substrate of rocks 25 mm to bedrock remained constant for all transects.

Middle Fork Payette River

Transects in Middle Fork Payette River began with the first 300 m above the Boiling Springs Guard Station and Transect 7 ending 2.2 miles above the Tie Creek Campground. As we moved downstream, wild and hatchery rainbow densities decreased and the streambed load of sand increased (Table 5).

The 1986 Boiling Springs fire burned much of the upper eastern drainage of the Middle Fork Payette River. A few burnt trees were observed in the river, but these did not affect water transparency this field season. The increase of colloids in downstream transects increased the difficulty of fish observations, requiring the repetition of counts to ensure accuracy. The composition of substrate changed from 25 mm to 150 mm rocks in Transect 1 to 90Z to 95% sand in Transect 7.

Table 4. Densities of fish (fish/100 $_{m2)}$ in snorkel transects in the Middle Fork Boise River, 1988.

Stream	Transect no.	Date Surveyed	Length (m)	Width (m)	Wild Rb	Brook Trout	White- fish	Hatchery Rb	CT
M. F. Boise R.	1	8/18/86	61	11.9	5.6	1	0	0	0
	2	"	54.3	12.8	0.1	0	0	0	0
	3	"	26.8	10.7	2.4	0	1.7	0	0
	4	"	51.8	14	3	0	2.3	0.8	0
	5	"	60.7	17.7	0.7	0	7.9	1.6	0.1
	6	"	34.1	15.8	0.9	0	3.9	0.9	0
	7	"	40.2	15.5	1.9	0	6.1	0.5	0.2

Table 5. Densities of fish (fish/100 m^2] in snorkel transects in the Middle Fork Payette River, 1988.

Stream	Transect no.	Date Surveyed	Length (m)	Width (m)	Wild Rb	Hatchery Rb	White- fish	Other observations
M. F. Payette R.	1	9/2/86	33.5	16.8	3.6	0.4	0.9	Clear; good visibility.
	2	"	58.6	15.2	7.2	1.2	4.2	"
	3	"	27.4	11.6	11	0.3	11	"
	4	"	29	12.8	3.5	0.5	2.7	"
	5	9/4/86	27.1	11	2	0	11.4	Increased turbidity.
	6	"	52.4	15.8	0.5	0.6	18	Heavy angling pressure.
	7	"	58.5	11.6	0	0	3.4	Heavy angling pressure. Much sand.

Other

Spot creel checks from regional conservation officers provided trend data for selected rivers and streams throughout Region 3(GC). Catch rates varied from a high of 4.4 fish/hr for Meadow Creek, a Boise River tributary, to a low of 0.24 fish/hr for the Boise River. Most catch rates obtained meet goal objectives for the 1985 fishery management plan of 0.50 fish/hr (Tables 6 and 7).

Table 6. Catch statistics for selected Region 3 (GC) rivers and streams from spot creel checks, 1986.

Water	Anglers	Hours	Catch	Fish/hr	Fish/angler
S. F. Boise River	40	143	34	0.24	0.85
Smith Creek	12	36	25	0.69	2.08
M. F. Boise R.	105	264	158	0.63	1.00
N. F. Boise R.	14	28	34	1.24	2.43
Rabbit Creek	5	33	22	0.67	4.40
Mores Creek	57	90	46	0.51	0.81
Grimes Creek	46	103	78	0.76	1.69
Snake River	721	1,873	826	0.44	1.15
Jacks Creek	26	81	137	1.69	5.27
S. F. Payette R.	40	41	97	2.35	2.43
N. F. Payette R.	10	20	-	-	-
Harris Creek	51	71	89	1.26	1.75
Squaw Creek	30	74	74	1.00	2.47
Lowline Canal	146	314	281	0.89	1.92

Table 7. Species composition (percentage of catch) of selected Region 3 (GC) rivers and streams from spot creel checks, 1986. (TR = trace.]

Water	Catch	Hrs.	Species composition (%)														
			WRB	HRB	KOK	CH	DV	BT	CT	WF	LMB	SMB	CC	BH	CR	YP	BG
S. F. Boise River	34	143	44	56													
Smith Creek	25	36	4	4				92									
M. F. Boise River	158	264	18	73		TR	6		2	1							
N. F. Boise River	34	275	6	88			3			3							
Rabbit Creek	22	33	14	86													
Mores Creek	46	89.5	28	61						11							
Grimes Creek	78	1,025	9	91													
Snake River	826	1,873	TR	5	TR					TR		15	69	1	3	3	3
S. F. Payette River	97	17	26							57							
N. F. Payette River	17	94								6							
Harris Creek	89	70.5	31	69													
Squaw Creek	74	74	28	69				3									
Lowline Canal	281	314		14							2		1	15	1	13	54

JOB PERFORMANCE REPORT

State of: Idaho

Project No.: F-71-R-11

Job No.: 3(GC)-d

Name: REGIONAL FISHERY MANAGEMENT INVESTIGATION

Title: Region 3 (Boise) Technical Guidance

Period Covered: July 1, 1986 to June 30, 1987

ABSTRACT

During the study period, we provided technical assistance to 11 state, federal and private land management agencies.

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Regional Fishery Manager

Brent Mabbott
Regional Fishery Biologist

OBJECTIVES

To provide technical assistance to city, county, state, federal and private land management agencies.

TECHNIQUES USED

We conducted field inspections and provided technical comment to various land management organizations regarding any activity that may have an impact on the fishery resource.

FINDINGS

Idaho Department of Water Resources

We received 77 applications from the Idaho Department of Water Resources for permits to alter stream channels below the mean high water mark (Table 1). Of the 77 applications received, 71% applied for work in the Boise River drainage, 10% in the Payette drainage, 9X in the Weiser drainage, 7% in the Owyhee drainage and 3% in the Salmon drainage. The placement of riprap and levee construction made up the majority of applications, with 31% of the total. Bridge construction and culvert placement amounted to another 23% of the applications.

The Idaho Department of Water Resources also asked for comment on 11 applications to appropriate spring water for fish propagation, 5 for mining activity and one for hydropower. We also provided testimony to the Idaho Water Resource Board for two applications under protest for the appropriation of water for hydropower purposes.

Idaho Department of Lands

During 1986, we made comment to the Idaho Department of Lands on 7 mining reclamation plans and 11 applications to operate a suction dredge. Of the dredge and placer mineral lease applications, all but two were in operation in 1986.

Federal Energy Regulatory Commission (FERC)

We received only two new applications for hydro construction during 1986. In addition, we continued to provide technical assistance on 11 other projects at various stages in the FERC process.

Table 1. Region 3 (GC) technical assistance by agency, type of activity and number of projects, 1986.

Agency	Type of activity	Number
Idaho Water Resources	Stream Alteration	77
	Water Right	11
Idaho Dept. of Lands	Reclamation Plans	7
	Dredge Mining	11
Idaho Department of Transportation	Bridge Replacement	8
	Gravel Removal	2
	Highway Construction	2
FERC	Hydro	13
U.S. Army Corps of of Engineers	404	8
U.S. Forest Service	Timber Harvest	8
	Grazing Allotment	3
	Fencing	2
	Mining	2
EPA	Discharge Permit	16
Idaho Parks	Stream Flow	2
City of Boise	Land Development	3
BLM	Mining	2
U.S. Bureau of Reclamation	Stream Flows	1
	Minimum Pool	1

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